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## PATENT SPECIFICATION



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## COMPLETE SPECIFICATION

## Improvements relating to Buttons or Analogous Fastening Devices

I, WILLIAM COSTELLO MONAHAN, of 45, Sydney Street, London, S.W.8, a citizen of the United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to buttons, studs, and analogous fastening devices and is especially applicable to tufts used in upholstery, mattresses and the like, but is also capable of wider application, for example to buttons for clothing.

An object of this invention is to provide an improved fastening device which may readily be secured or released, when desired, and which does not tend to become released accidentally or to damage articles to which it is applied.

In a method of tufting an article such as a mattress, upholstery or the like comprising piercing the article with a needle or the like, inserting in the needle one head of a completely preformed tufting element having a flexible body with a stiff tufting head at each end thereof, drawing the needle with said inserted head through the article until the other head engages one face of the article, and then releasing said inserted head to permit of its engagement with the other face of the article, it has been proposed to place an ornamental element such as a button or the like on the shank of the needle so that said inserted head will engage the button or the like, fitting in a suitable recess or opening formed therein, and hold it against the face of the article.

According to the present invention a fastening device comprises a flexible element, a washer-like button member and a rigid head of elongated form attached to one end of said flexible element, said head being formed with a projection extending over part of its underside and being of such dimensions that it may be readily passed endwise through and then tilted to lie across the aperture of the button member with its projection extending into said aperture.

The projection may be a tight or push fit in the recess, and opposite contiguous side faces of the projection and of the aperture in the washer-like member may be slightly undercut, the material of the head and/or the washer-like member being of such resiliency that slight compression and subsequent expansion takes place at said faces as the projection enters and arrives fully in position in the aperture.

Further, the washer-like button member may be recessed from its outer face in the neighbourhood of the aperture therein, the elongated head fitting into said recess when in position across the aperture. The head may be a tight or push fit in the recess, and opposite contiguous side faces of the head and of the recess in the washer-like member may be slightly undercut, the material of the head and/or washer-like member being of such resiliency that slight compression, and subsequent expansion takes place at said contiguous faces as the head enters and arrives fully home in the recess.

Various constructional embodiments of tufting devices in accordance with this invention are illustrated in the accompanying drawings, in which:

Figs. 1 to 4 show one form. Fig. 1 is a perspective view showing the head and the apertured member spaced apart. Figs. 2 and 3 are sectional views mutually at right angles along the length and across the width of the head respectively. Fig. 4 is a perspective view showing the way in which the head passes in an abnormal disposition through the apertured member.

Figs. 5 and 6 are perspective views showing alternative arrangements of head and apertured member.

Figs. 7 to 16 are sectional views showing various forms of head and apertured member. Figs. 9 and 11 are views at right angles to Figs. 8 and 10 respectively.

Fig. 17 shows diagrammatically a tufting operation using a device in accordance with this invention.

Referring to the drawings, Figs. 1 to 104. A tufting device comprises a head

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100, an apertured member 110 and a flexible element 120. In this case the flexible element consists of a doubled loop of twine. The sides of the head 100 are slightly barrel shaped, as indicated at 101, and when the head is engaged with the apertured member, the head 100 lies snugly in a recess 111 in the upper surface of the apertured member 110. A hole 102 extends through the head 100 in the direction of its length. The twine 120 is passed through this hole to secure it to the head, the twine being freely movable through the hole. As indicated at 103, the hole 102 towards either end of the head becomes a slot open towards the under-side of the head. This facilitates moulding of the head and allows the thickness of the tufting element to be slightly reduced. The floor 112 of the recess 111 in the apertured member is provided with a raised part 113 which engages the slot 103 in the under-side of the head. On its under surface the head 100 is provided with a projection 104 which lies in the aperture 114 in the apertured member. This projection 104 may if desired be a close fit in the aperture 114 (subject to a clearance for the twine 120) or it may lie loosely in the aperture as shown. In the construction shown in Figs. 1 to 4, this projection 104 is not a close fit in the aperture 114 but the relative positions of the head 100 and apertured member 110 are maintained by the barrel shaped sides 101 of the head engaging the corresponding parts of the recess 111 in the apertured member. The lower surface of the apertured member is provided with a strengthening bulge 115 which extends in the direction of the length of the recess 111.

To engage the head in the apertured member the head is passed through the aperture 114 in an abnormal position, as illustrated in Fig. 4. It will be seen that the aperture 114 is of sufficient size to permit the passage through it in this position of the head 100 carrying with it the twine 120. When the head 100 has been passed right through the apertured member, it is turned from the abnormal position, shown in Fig. 4, to a normal position, as shown in Fig. 1, in which it may be drawn down to lie in the recess 111 in the upper surface of the apertured member.

If desired the walls of the recess 111 may be undercut slightly or otherwise arranged to engage resiliently the upper part of the sides 101 of the head, the width of the head being slightly less at its upper surface than at its lower surface.

An alternative construction is illus-

trated in Fig. 5. In this case the sides 201 of the head 200 are parallel to each other while the recess 211 in the upper surface of the apertured member 210 is of similar shape. When the head and apertured member are assembled, they are of generally circular form which may be found desirable in certain classes of upholstery. The projection 204 below the head 200 is slightly wider at its lower end than adjacent the head, and is arranged to be a close fit in the aperture 214 of the apertured member, thereby preventing relative movement between these two parts of the tufting element. If desired, the projection 204 may be arranged to be a push fit in the aperture 214 to restrain the two parts against disengagement. A loop of twine 220 passes through a hole (not shown) in the under-side of the head 300. When tension is applied to the twine 220 it lies in generally vertical grooves 203 formed in the faces 205 of the projection 204 on the under-side of the head 200.

Fig. 6 illustrates a further alternative arrangement in which the head 300 is drawn into a recess 311 in the surface of an apertured member 310 and is surrounded on all sides by the walls of the recess. The head 300 is of oval shape and has a projection 301 with a hole 302 through which passes a loop of twine 320, the twine being arranged to lie in grooves 306 at the sides of the projection 301. It is desirable that the length of the head 300 should be considerably greater than its width as it is necessary for the greatest dimension of the aperture 314 in the apertured member to be greater than the width of the head. Similarly the thickness of the head must be less than the width of the aperture 314 and should be somewhat less than the width of the head. By suitable proportioning of the dimensions of the head and of the aperture in the apertured member, it is possible to obtain a suitable width of floor 312 of the recess 311 around the aperture 314.

Various alternative methods of attaching the flexible element to the head are illustrated in Figs. 7 to 17. In the arrangement illustrated in Fig. 7, the head 400 has a hole 401 which runs transversely of the head and through which is passed a doubled loop of twine 402. The head has a projection 403 on its under surface which, when the tufting device is assembled, engages as a push fit in the aperture 404 of the apertured member 405.

Figs. 8 and 9 show an alternative arrangement in which the head 410 has a projection 411 on its under surface which

is provided with a curved slot 412 having an enlargement 413 at its inner end. The doubled loop of twine 414 is secured to the head by passing it along the slot 412 from its lower end until it lies in the enlargement 413.

An apertured member 415 has a recess 416 in its upper surface and an aperture 417 which is enlarged at its lower end at 418 as shown. The projection 411 is wider at its lower end than the aperture 417. The slot 412 and the resilience of the material allow this enlarged end of the projection to be compressed in passing through the aperture 417 and to increase in size on reaching the enlargement 418 thus securing the head to the apertured member.

In the construction shown in Figs. 10 and 11, the head 420 has on its under surface a projection 421 with a curved slot 422 having at its end an enlargement 423. The slot 422 extends in the direction of the length of the head 420 but in other respects is similar to the slot 412 of Figs. 8 and 9. The flexible element consists of a loop of twine 424. An apertured member (not shown) of suitable shape is provided.

A further alternative construction is shown in Fig. 12 in which the head 430, having a downward projection 431, is provided with a slot 432 extending from its upper surface 433. A loop of twine 434 is engaged in the slot 432, but when the tufting element is in position, the flexing of the head due to the upward pressure on its ends, which engage an apertured member 435, causes the upper end of the slot 432 to be reduced in width, thus preventing withdrawal of the twine from the slot.

In the arrangement illustrated in Fig. 13, the head 440, having a downward projection 441, has two holes 442 which extend through the thickness of the head and which have between them a rib 443. At the upper surface of the head the two holes 442 are joined by an open slot 444. A loop of twine 445 extends up through one of the holes 442 across the head 440 and down through the other hole 442.

Fig. 14 shows another arrangement in which a head 450, having a downward projection 451, has a hole 452 extending vertically through its thickness, and provided at its upper end with an enlargement 453 which is of sufficient size to house a knot 454 formed at the end of a single length of twine 455.

In the constructions illustrated in Figs. 13 and 14 the flexible element consists of a piece of tape 460 which is secured by an adhesive in a recess 461 provided for this purpose and extending

from the under surface of the head 462. In the construction shown in Fig. 15, the width of the tape 460 runs in the direction of the length of the head which is provided with a downward projection 463. The arrangement of Fig. 16 is similar except that the width of the tape extends across the head.

A method of tufting employing a device in accordance with this invention is illustrated diagrammatically in Fig. 17. A tufting device having an apertured member 600 is connected by a flexible element 601 to an elongated head 602 which is shown as being of the type illustrated in Fig. 7 of the drawings. The head 602 is engaged in a recess 603 at the rear end of a tufting needle 604 either before the tufting needle has been engaged in the mattress or after the point of the needle has been passed through it. The needle is then drawn completely through the mattress so that the upper head 602 occupies a position generally as illustrated in Fig. 17 while the apertured member 600 is drawn against the lower surface 605 of the mattress.

An apertured member 606 of suitable form for cooperating with the head 602 is then passed over the needle from its point end into a position 606', indicated in dotted lines, in which position the apertured member 606 engages the upper surface 607 of the mattress. The head 602 is then released from the recess 603 of the tufting needle 604 and is allowed to assume a normal position transversely of the apertured member 606. This tufting operation is facilitated if the mattress is held under compression while the tufting operation is performed. When the operation has been completed, the mattress is allowed to assume its full thickness as determined by the length of the tufting devices.

Alternatively a needle having a recess for the head of the tufting device adjacent its point may be used. In this case, the needle having the head engaged in the recess, is passed through the mattress and through the aperture in the apertured member. The head is then released from the needle which is drawn back through the mattress while the head assumes a position across the apertured member.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A fastening device comprising a flexible element, a washer-like button member and a rigid head of elongated

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form attached to one end of said flexible element, said head being formed with a projection extending over part of its underside and being of such dimensions that it may be readily passed endwise through and then tilted to lie across the aperture of the button member with its projection extending into said aperture.

2. A fastening device as claimed in Claim 1, wherein the projection is a tight or push fit in the recess.

3. A fastening device as claimed in Claim 1 or 2, wherein opposite contiguous side faces of the projection and of the aperture in the washer-like member are slightly undercut, the material of the head and/or of the washer-like member being of such resiliency that slight compression and subsequent expansion takes place at said faces as the projection enters and arrives fully in position in the aperture.

4. A fastening device as claimed in any preceding claim, wherein the washer-like button member is recessed from its

outer face in the neighbourhood of the aperture therein, the elongated head fitting into said recess when in position across the aperture.

5. A fastening device as claimed in Claim 4, wherein the head is a tight or push fit in said recess.

6. A fastening device as claimed in Claim 4 or 5, wherein opposite contiguous side faces of the head and of the recess in the washer-like member are slightly undercut, the material of the head and/or washer-like member being of such resiliency that slight compression, and subsequent expansion takes place at said contiguous faces as the head enters and arrives fully home in the recess.

Dated this 19th day of September, 1939.

For the Applicant,

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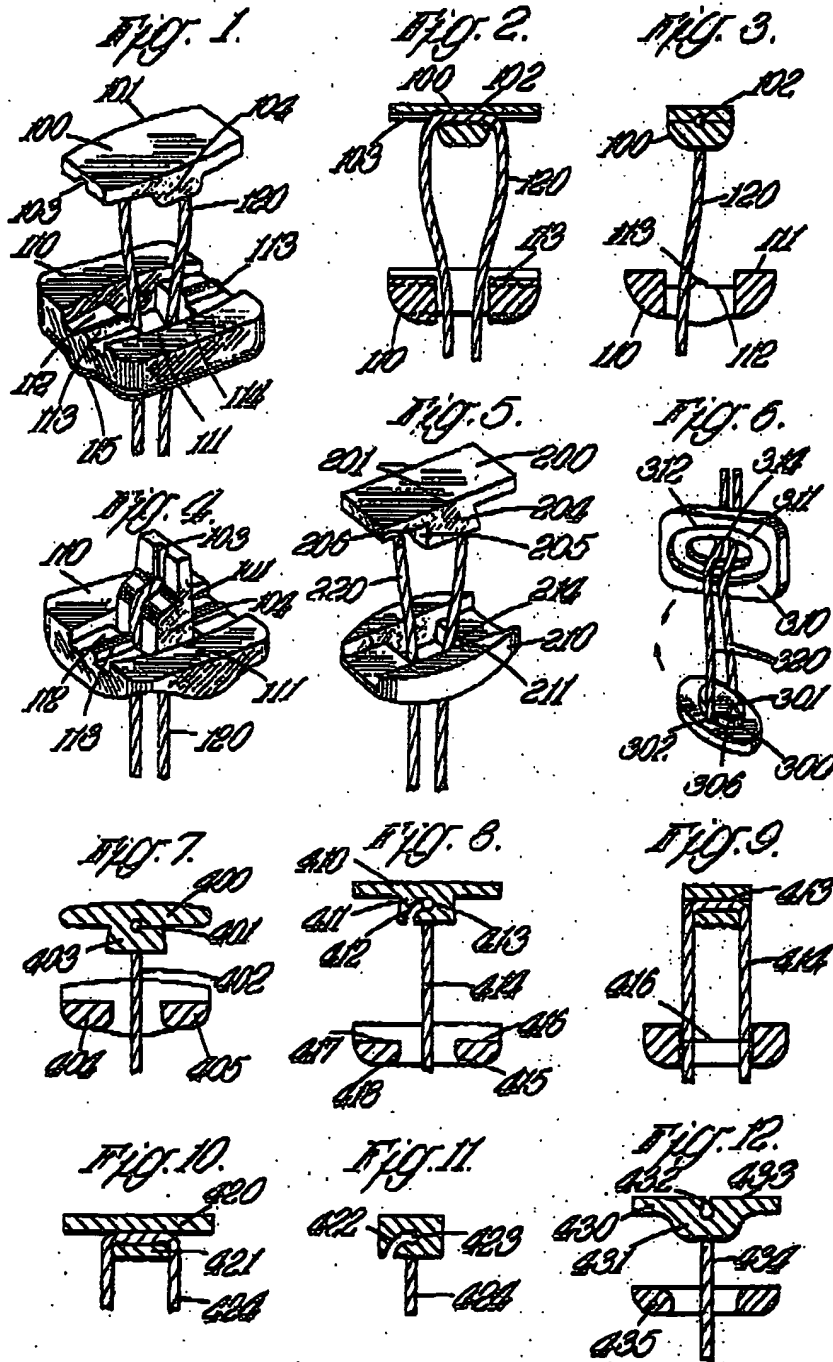
Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1941.

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## 598,157 COMPLETE SPECIFICATION

SHEET 1

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SHEET 1

2 SHEETS  
SHEET 8

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FIG. 13

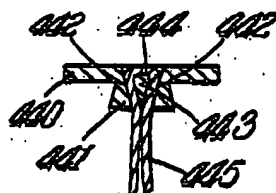


FIG. 14

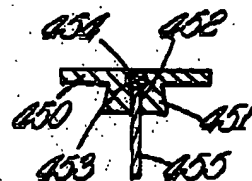


FIG. 15

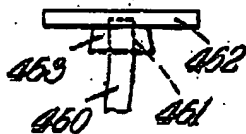


FIG. 16

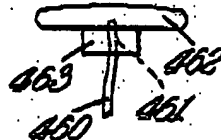
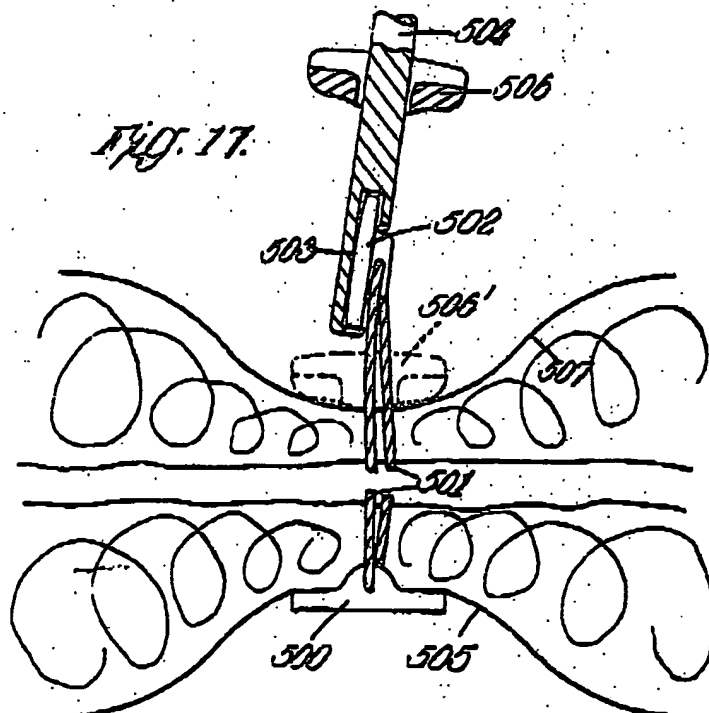


FIG. 17



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